

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-66
Relating to Exemptions under Section 27156
of the Vehicle Code

ALONDRA, INC.
"FILT-O-REG"

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 39515 of the Health and Safety Code and Executive Order G-30A;

IT IS ORDERED AND RESOLVED: That the installation of the "Filt-O-Reg" fuel pressure regulator manufactured by Alondra, Inc., 826 W. Hyde Park Boulevard, Inglewood, California 90302, has been found to not reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1976 and older vehicles that are powered by gasoline engines with conventional carburetors.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different ~~than~~ those listed by the vehicle manufacturer.

from

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board.

This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE "FILT-O-REG" DEVICE.

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the State board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the State board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at Sacramento, California, this 28 day of June, 1976.

original signed by
Thomas C. Austin
Deputy Executive Officer-Technical

State of California

AIR RESOURCES BOARD

May 25 , 1976

Staff Report

Evaluation of Alondra, Inc.
"Filt-O-Reg" and "View-All"
for Compliance with the Requirements
of Section 27156 of the Vehicle Code

I. Introduction

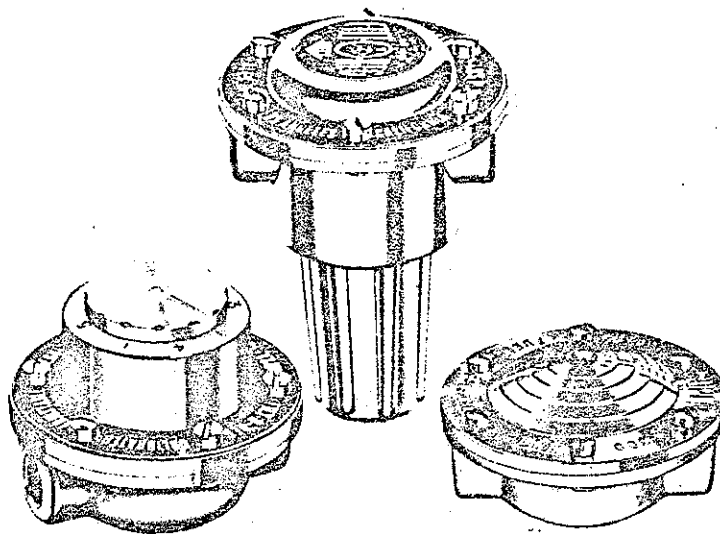
On March 15, 1976, the Air Resources Board received an application from Alondra, Inc., Ingelwood, California, requesting an exemption from the prohibitions of Vehicle Code Section 27156 for the "Filt-O-Reg" fuel pressure regulator and the "View-All" fuel filter. The applicant requests that the exemption be granted for all 1976 and older vehicles that are powered by gasoline engines with conventional carburetors. (See Appendix A).

II. Description

The "Filt-O-Reg" is a fuel pressure regulator connected into the fuel line at the carburetor. It is designed to maintain the required fuel flow to the carburetor at minimum pressures. The applicant states this will enable the float valve to hold a more uniform level in the carburetor bowl. As a result, claims are made that the "Filt-O-Reg" will prevent carburetor flooding, stalling and vapor lock, will smoothen idling and "save gas".

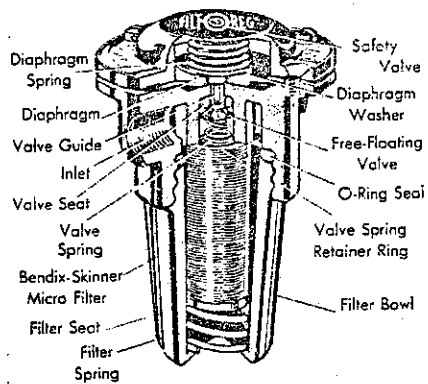
There are three basic models of the "Filt-O-Reg" (See Figure 1): the model CA (adjustable pressure unit), the model C (preset pressure unit with a fuel filter) and the model S (preset pressure unit). The models C and S are available with outlet pressures of 3/4, 2 and 3 psi. The model CA is adjustable from 1 to 5 psi in 1/2 psi increments by use of a detent selector. The correct regulator (correct setting on model CA) for a particular vehicle is determined from a vehicle application chart (See Appendix B).

The "Filt-O-Reg" functions through the action of a free-floating valve and a spring-loaded diaphragm (See Figure 2). Pulsating fuel enters the device from the fuel pump. Initially, this fuel passes around the free-floating valve, flows under the diaphragm and flows to the carburetor. As the carburetor float valve closes, excessive pressure pushes the diaphragm upward. This allows the valve spring to push the free-floating valve up against the O-ring seal and close off the fuel pump from the carburetor. As the carburetor float valve opens, the pressure to the carburetor drops causing the diaphragm to drop and the free-floating valve to open. Since the fuel pressure is pulsating, this cycle is repeated continuously causing the fuel pressure to the carburetor to be reduced.



"Filt-O-Reg" Models CA, C and S

Figure 1



"Filt-O-Reg" Model C (cut-away view)

Figure 2

The "View-All" is a porous medium, gasoline filter with either a pyrex or aluminum housing. The filter element is made from helically-wound cellulose ribbons impregnated with phenolic resin and is rated at 40 microns absolute. The "View-All" filter was not evaluated but is assumed to be functionally equivalent to original equipment.

III. Evaluation

The ARB evaluated the "Filt-O-Reg" by flow testing a model CA regulator (adjustable) in the engine laboratory (Reference ARB test report B-76-2, February 1976). The flow tests were performed on a 1962 Plymouth V-8 engine (318-2V). Four operational modes were used to evaluate three pressure settings of the regulator, settings #1, #3 and #5 (1, 3 and 5 psi, approximately). A summary of the results is shown in Table I and Figure 3.

The flow testing showed that the "Filt-O-Reg" generally reduces the fuel pressure to the carburetor which results in leaner fuel/air mixtures. This phenomenon can be explained as follows:

- a. The carburetor float valve operates as a variable orifice

where the flow rate (\dot{m}) is described by

$$\dot{m} = C_d A \sqrt{2g\rho\Delta p} = K_z \sqrt{2g\rho P_2}$$

C_d = discharge coefficient

ρ = fuel density

A = orifice area

Δp = pressure differential ($P_2 - P_{atm}$)

g = gravitational constant

P_2 = carburetor inlet pressure

$K_z = C_d A$ as a function of the float level, z , where z is the liquid height above a reference.

Table I
Summary of Fuel-Air Measurements

Engine Speed Manifold Vacuum	600 rpm 18" Hg	1000 rpm 15" Hg	2000 rpm 10" Hg	2500 rpm WOT
Baseline				
Air (SCFM)	9.6	30.8	93.6	182.7
Fuel (lbs/min)	.069	.148	.481	1.000
Fuel Air Ratio	.095	.063	.068	.072
Setting #1				
Air (SCFM)	9.7	30.3	93.2	182.7
Fuel (lbs/min)	.064	.131	.467	1.000
Fuel Air Ratio	.087	.057	.066	.072
Net Change	-8%	-10%	-3%	0
Setting #3				
Air (SCFM)	9.7	30.9	93.1	183.1
Fuel (lbs/min)	.065	.135	.472	1.020
Fuel Air Ratio	.088	.057	.067	.073
Net Change	-7%	-10%	-1%	+2%
Setting #5				
Air (SCFM)	9.7	30.9	93.1	183.7
Fuel (lbs/min)	.066	.139	.476	1.042
Fuel Air Ratio	.090	.059	.067	.075
Net Change	-5%	-6%	-1%	+3%

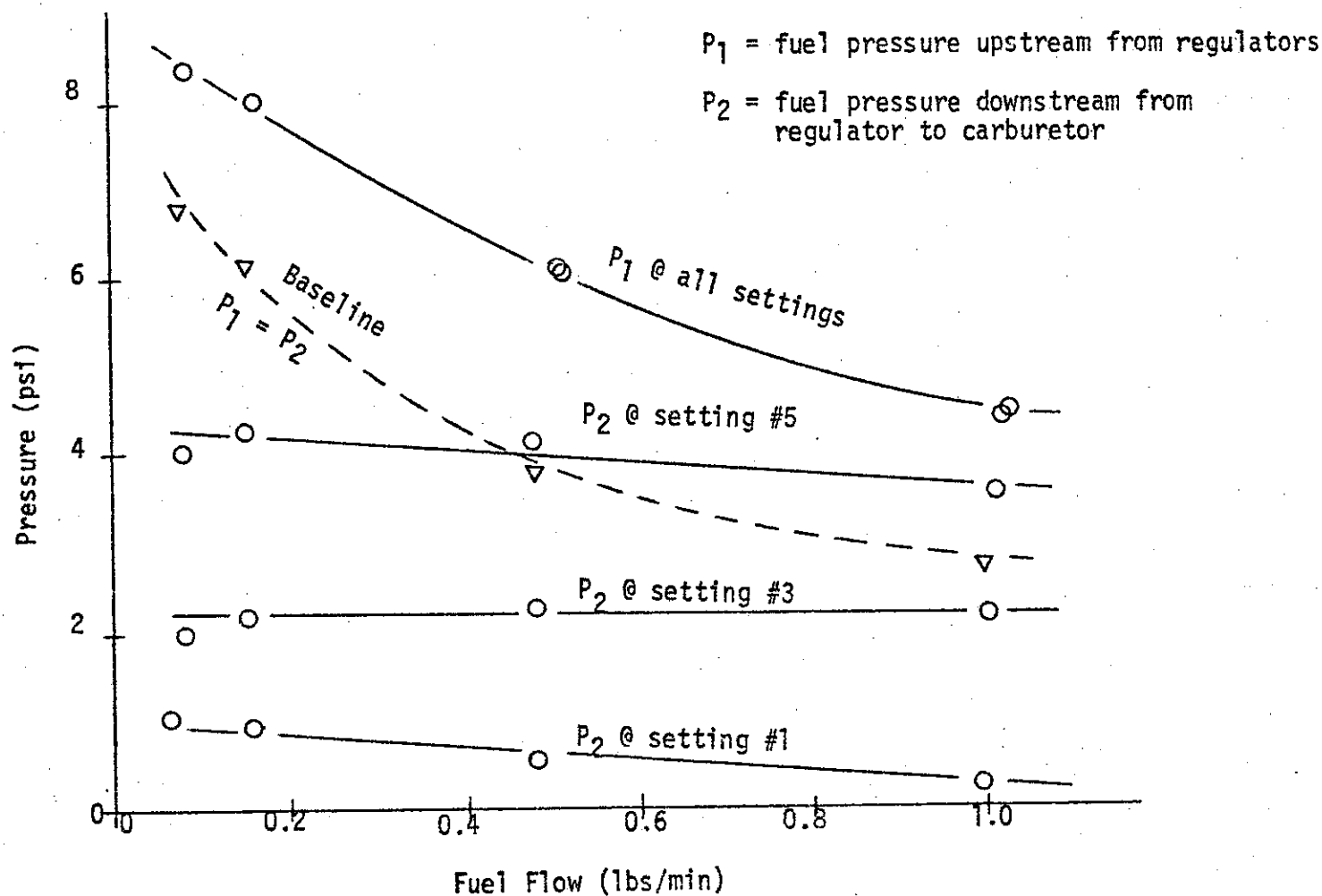


Figure 3

- b. Reducing the carburetor inlet pressure (P_2) requires a higher K_z to maintain any flow rate (\dot{m}) into the bowl. This requires a slightly lower float level and fuel level in the bowl (Δz).
- c. The lower fuel level increases the head that must be overcome by the main and idle circuits and reduces the fuel flow for any throttle (air flow) setting; this fuel reduction is more significant at low engine speeds where Δp across the venturi is small ($\Delta p \approx \Delta z$). The result is a leaner fuel/air mixture.
- d. Increasing the carburetor inlet pressure reverses the above process and raises the float and fuel level. This results in enrichment (See Table I and Figure 3 for Setting #5 at Wide-Open-Throttle).

(The flow testing was performed at constant engine speeds and constant manifold vacuums to determine the effects of the device at a fairly constant airflow. However, these baseline and device tests do not directly show a typical driving comparison, at constant speed and constant load. The test data ^{do} ~~does~~ indicate that a greater air flow will be required to attain an approximately equal BSFC as baseline. As a result, equal performance would be achieved at leaner fuel/air mixtures.)

The leaning effects of this device occurred mainly at low engine speeds. This leaning should lead to lower HC and CO emissions providing there are no lean misfires (certain carburetors tend to be lean in the off-idle position but with normal driving the acceleration circuit usually covers this anomaly; the device would possibly cause some

lean misfire with these carburetors by driving constantly at the anomaly. This device may also cause lean misfire on newer vehicles where OEM has designed for maximum idle leanness). NOx emissions with this device may either increase or decrease depending on which side of stoichiometric the carburetor is predominantly operated (See Figure 4).

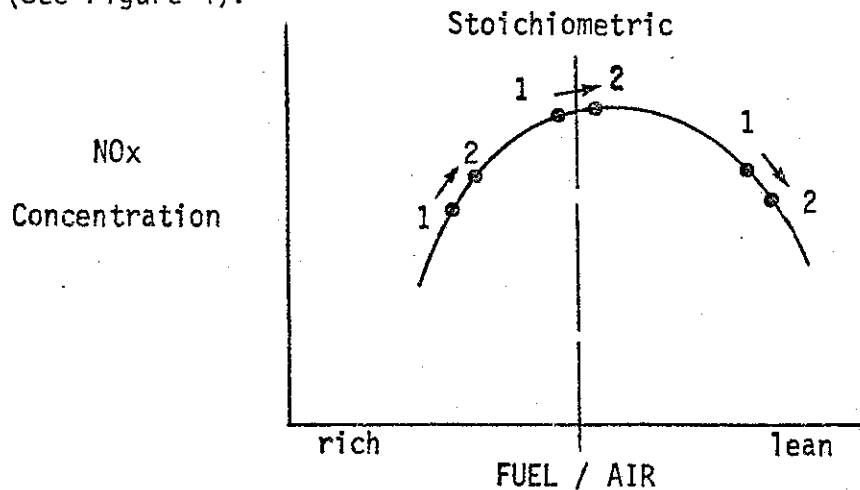


Figure 4

The installation instructions for this device do not indicate any idle adjustments. However, this device may alter idle performance, in which case, adjusting the engine to manufacturer's idle specifications would mitigate some of the device's effects.

IV. Claims

The applicant's claims for this device (prevent flooding, stalling and vapor lock; smoother idling; fuel savings) appear to have merit for various vehicles under certain operating conditions. Carburetor flooding and vapor lock are fuel pressure related problems that can cause rough idling, stalling and extra fuel consumption. Reducing the fuel pressure to the carburetor and/or increasing the fuel

pressure from the fuel pump to the regulator (See P_1 in Figure 3) could help alleviate these problems. A slight improvement in fuel economy could result on some vehicles at idle or low speeds.

V. Conclusion and Recommendations

Flow testing of the "Filt-O-Reg" demonstrated some leaning of the fuel/air mixture mainly at low engine speeds. These tests showed that a slight fuel savings may result under certain vehicle operating conditions. The staff believes that the use of the "Filt-O-Reg" device will not lead to increased emissions and recommends that Alondra, Inc., be granted an exemption from the prohibitions of Vehicle Code Section 27156.



ALONDRA, INC. 826 W. HYDE PARK BOULEVARD, INGLEWOOD, CALIF., 90302
(213) 678-4500

February 26, 1976

Chairman
AIR RESOURCES BOARD
State of California
1709 - 11th Street
Sacramento, California 95814

Dear Sir:

This letter is to officially request the evaluation of our FILT-O-REG fuel pressure controls (fuel flow regulators) and also our VIEW-ALL inline fuel filters for compliance with Section 27156 of the Vehicle Code.

The devices are detailed and described in the attached product catalogs and literature.

The fuel pressure regulators are designed to provide a positive, even flow of fuel from the tank, thru the fuel pump and then thru our FILT-O-REG unit(s) to the carburetor of any gasoline (internal combustion) engine new or used vehicle.

The fuel filters, using the famous Bendix Microbon cellulose ribbon element with 40 micron filtration purifies the fuel and traps water as well as dirt, grit, metal particles and other harmful matter before it can reach and damage the delicate needle valve assembly.

Also one model...the "C" regulator is a combination regulator with built-in fuel filter all in one compact unit. And uses the identical Microbon filter element used in our inline fuel filters.

Alondra, Inc. has no independent tests to submit concerning emission tests.

We respectfully request The Board findings on our Models or stock numbers CA, C-200, C-300, S-200, S-300 FILT-O-REG units; and our VA-4, VA-5, VA-6 and V-4 and V-5 VIEW-ALL fuel filter stock numbers.

After an introductory meeting with Mr. Richard J. Kenny, followed by a session with Mr. Irving Ettinger, it was suggested that our factory send direct to Mr. Ettinger's office products as listed above, together with all possible data. This is being done promptly to expedite evaluation.

MANUFACTURERS OF GASOLINE ENGINE ACCESSORIES



for Automotive, Farm, Industrial, Motorcycle & Snowmobile Engines



ALONDRA, INC. 826 W. HYDE PARK BOULEVARD, INGLEWOOD, CALIF., 90302
(213) 678-4500

Alondra, Inc. has been the exclusive manufacturer and marketer of these patented devices for the fuel system since February 15, 1955 with the FILT-O-REG and the past eight years our VIEW-ALL fuel filters.

We appreciate this opportunity for the Air Resources Board to evaluate these units. And look forward to your favorable findings applicable to all makes, models, year vehicles.

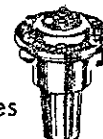
I shall be glad to answer any questions to the best of my ability. Thank you.

Cordially yours,

Lawrence Raymond
Lawrence Raymond
President & Sales Director

LR/r

MANUFACTURERS OF GASOLINE ENGINE ACCESSORIES



for Automotive, Farm, Industrial, Motorcycle & Snowmobile Engines

ALONDR ENGINE ACCESSORIES



FILT-O-REG
Fuel Pressure
CONTROLS

AUTOMOTIVE APPLICATION CHART

VIEW-ALL
Inline
GAS FILTERS



1964-1974 MAKE OF CAR	ENGINE NUMBERS	CARB. TYPE	CA SETTING	S FILT-O-REG	FITTING KIT	C FILT-O-REG	FITTING KIT	VIEW-ALL FILTER
AMERICAN MOTORS 6 Cyl. V-8 V-8	199, 232, 258 290, 304, 343, 360 343, 390, 401	1 bbl 1 & 2 bbl 4 bbl	2 3 3½	S-200 S-300 S-300	FH-5 FH-5 FH-5	C-200 C-300 C-300	FC-5 FC-5 FC-5	VA-5 VA-5 VA-5
BUICK 6 Cyl. V-8 V-8 V-8	225, 250 300, 400 350, 400, 455 350, 400, 401, 425, 430, 455	1 bbl 1 bbl 2 bbl 4 bbl	2 3 3½ 3½	S-200 S-300 S-300 S-300	FH-5 FH-5 FH-5† FH-5†	C-200 C-300 C-300 C-300	FC-5 FC-5 FC-5§ FC-5§	VA-5 VA-5 VA-5* VA-5*
CADILLAC V-8	429, 472, 500	4 bbl	3	S-300	FH-5	C-300	FC-5	VA-5
CHEVROLET 4 Cyl. 6 Cyl. V-8 V-8	140 230, 250 283, 300, 307, 327, 350, 400 350, 396, 402, 427, 454	1 bbl** 1 bbl 1 & 2 bbl 4 bbl	2 2 3 3½	S-200 S-200 S-300 S-300	FH-4 FH-5 FH-5 FH-5	C-200 C-200 C-300 C-300	FC-4 FC-5 FC-5 FC-5	VA-4 VA-5 VA-5 VA-5
CHRYSLER V-8	360, 383, 400, 440		3½-4	S-300	FH-5	C-300	FC-5	VA-5
DOUGE 6 Cyl. V-8 V-8 V-8	170, 198, 225 273, 318, 340, 360, 361, 383, 400, 413, 426 340, 383, 426, 440 340, 426, 440	1 bbl 2 bbl 4 bbl 2 bbl†	2½ 3 3½ 4	S-200 S-300 S-300 S-300**	FH-5 FH-5 FH-5 FH-5	C-200 C-300 C-300 C-300**	FH-5 FH-5 FH-5 FH-5	VA-5 VA-5 VA-5 VA-5
FORD 4 Cyl. 6 Cyl. V-8 V-8 V-8 V-8	Pinto 170, 200, 240, 250 289, 352, 390 260, 289, 302, 351, 390 351, 390, 400, 427, 428, 429, 460 406	1 bbl 1 bbl 1 bbl 2 bbl 4 bbl 2 bbl†	2 2 3 3 3½ 4	S-200 S-200 S-300 S-300 S-300 S-300**	FH-5 FH-5 FH-5 FH-5 FH-5† FH-5	C-200 C-200 C-300 C-300 C-300 C-300**	FC-5 FC-5 FC-5 FC-5 FC-5§ FC-5	VA-5 VA-5 VA-5 VA-5 VA-5* VA-5
LINCOLN-CONTINENTAL V-8	460, 462	4 bbl	3½	S-300	†	C-300	†	VA-5
MERCURY 4 Cyl. 6 Cyl. V-8 V-8 V-8	200, 250 289, 302 302, 351, 390, 400 351, 410, 427, 428, 429, 460	1 bbl 1 bbl 2 bbl 4 bbl	2 2 3 3½ 3½	S-200 S-200 S-300 S-300 S-300	FH-5 FH-5 FH-5 FH-5† FH-5†	C-200 C-200 C-300 C-300 C-300	FC-5 FC-5 FC-5 FC-5§ FC-5§	VA-5 VA-5 VA-5 VA-5** VA-5**
OLDSMOBILE 6 Cyl. V-8 V-8	250 330, 350, 394, 400, 425, 425 330, 350, 394, 400, 455	1 bbl 2 bbl 4 bbl	2 3½ 3½	S-200 S-300 S-300	FH-5 FH-6 FH-6	C-200 C-300 C-300	FC-5 FC-6 FC-6	VA-5 VA-6 VA-6
PLYMOUTH 6 Cyl. V-8 V-8	170, 198, 225 273, 318, 340, 360, 383, 400, 426 340, 383, 440, 426	1 bbl 2 bbl 4 bbl	3 3½ 3½	S-300 S-300 S-300	FH-5 FH-5 FH-5	C-300 C-300 C-300	FC-5 FC-5 FC-5	VA-5 VA-5 VA-5
PONTIAC 6 Cyl. V-8 V-8 V-8	250 307, 326, 350, 389 326, 350, 400, 421, 428, 455 389, 421	All 2 bbl 4 bbl 2 bbl†	2 3 3 4*	S-200 S-300 S-300 S-300**	FH-6 FH-6 FH-6 FH-6	C-200 C-300 C-300 C-300**	FC-6 FC-6 FC-6 FC-6	VA-6 VA-6 VA-6 VA-6

* Use VA-6 with Air-Conditioning
** Regulator at each carburetor
† Needs other fittings
‡ Use FH-6 with A/C

**SEE OTHER SIDE for COMPLETE VEHICLE IDENTIFICATION
and IMPORTED CARS APPLICATION ➡**

MODEL	LISTED UNDER	MODEL	LISTED UNDER	MODEL	LISTED UNDER	MODEL	LISTED UNDER
A		D		H		R	
AMBASSADOR	Amer. Mtrs.	DART	Dodge	HATCHBACK	Chevrolet	RIVIERA	Buick
AMERICAN	Amer. Mtrs.	DELMONTE 88	Oldsmobile			ROAD RUNNER	Plymouth
AMX	Amer. Mtrs.	DELTA 88	Oldsmobile	IMPALA	Chevrolet	ROGUE	Amer. Mtrs.
APOLLO	Buick	DEMON	Dodge	IMPERIAL	Chrysler		
B		DEVILLE	Cadillac	J		N	
BARRACUDA	Plymouth	DUSTER	Plymouth	JAVELIN	Amer. Mtrs.	NEWPORT	Chrysler
BEL AIR	Chevrolet	E		JETFIRE	Oldsmobile	NEW YORKER	Chrysler
BELVEDERE	Plymouth	EIGHTY-EIGHT	Oldsmobile	JETSTAR	Oldsmobile	NINETY-EIGHT	Oldsmobile
BISCAYNE	Chevrolet	EL CAMINO	Chevrolet	L		NOVA	Chevrolet
BONNEVILLE	Pontiac	EL DORADO	Cadillac	LAGUNA	Chevrolet	O	
C		ELECTRA	Buick	LANCER	Dodge	OMEGA	Oldsmobile
CALAIS	Cadillac	ESPRIT	Pontiac	LEBARON	Chrysler	P	
CAMARO	Chevrolet	EXECUTIVE	Pontiac	LEMANS	Pontiac	PARK LANE	Mercury
CAPRI	Mercury	F		LESABRE	Buick	PINTO	Ford
CAPRICE	Chevrolet	F-85	Oldsmobile	LTD	Ford	POLARA	Dodge
CATALINA	Pontiac	FAIRLANE	Ford	LUV	Chevrolet	S	
CENTURION	Buick	FALCON	Ford	LUXUS	Buick	SATELLITE	Plymouth
CENTURY	Buick	FIVE HUNDRED	Ford	M		SCAMP	Plymouth
CHALLENGER	Dodge	FIREBIRD	Pontiac	MALIBU	Chevrolet	SIGNET	Plymouth
CHARGER	Dodge	FORMULA S	Pontiac	MANTA	Buick	SKYLARK	Buick
CHEVELLE	Chevrolet	FOR-FOUR-TWO	Oldsmobile	MARK III, IV	Lincoln	SPECIAL	Buick
CHEVY II	Chevrolet	FURY	Plymouth	MARAUDER	Mercury	SWINGER	Dodge
CLASSIC	Amer. Mtrs.	G		MARQUIS	Mercury	T	
COBRA	Ford	GALAXIE	Ford	MATADOR	Amer. Mtrs.	TEMPEST	Pontiac
COLT	Dodge	GRABBER	Ford	MAVERICK	Ford	THUNDERBIRD	Ford
COMET	Mercury	GRAN SPORT	Buick	METEOR	Mercury	TORINO	Ford
CONTINENTAL	Lincoln	GRAN TORINO	Ford	MONACO	Dodge	TORONADO	Oldsmobile
CORONET	Dodge	GRAND AM	Pontiac	MONTE CARLO	Chevrolet	V	
CORVAIR	Chevrolet	GRAND PRIX	Pontiac	MONTEGO	Mercury	VALIANT	Plymouth
CORVETTE	Chevrolet	GRANDVILLE	Pontiac	MUSTANG	Ford	VEGA	Chevrolet
COUGAR	Mercury	GREMLIN	Amer. Mtrs.	R		VENTURA	Pontiac
CRICKET	Plymouth	GS	Buick	REBEL	Amer. Mtrs.	VISTA CRUISER	Oldsmobile
CROWN	Chrysler	GTO	Pontiac	REGAL	Buick	W	
CUSTOM 500	Ford	GTS	Dodge			WILDCAT	Buick
CUSTOM 880	Dodge						
CUTLASS	Oldsmobile						
CYCLONE	Mercury						

Application Chart IMPORTED CARS

ALFA ROMEO	CITROEN	FORD (Germany)	MASERATI	MORRIS	RENAULT	TOYOTA
AUSTIN	DATSON	HILLMAN	MAZDA	NSU	SAAB	TRIUMPH
AUSTIN-HEALY	DKW	HONDA	MERCEDES-BENZ	OPEL	SIMCA	VAUXHALL
BMW	FIAT	JAGUAR	MG	PEUGEOT	SUBARU	VOLKSWAGEN
BORGWARD	FORD (Britain)	LANCIA	MORGAN	PORSCHE	SUNBEAM	VOLVO



FUEL PRESSURE CONTROLS

IMPORTED CARS

USE THIS GUIDE FOR
CORRECT FILT-O-REG

- Engines under 100 cu. in. or 1600 cu. cm.
C-75, S-75 or CA set at 1
- Engines 100 to 250 cu. in. or 1600 to 4100 cu. cm.
C-200, S-200 or CA set at 2

FILT-O-REG fuel pressure controls are not to be used on FUEL INJECTION type engines.

- Engines over 250 cu. in. or over 4100 cu. cm.
C-300, S-300 or CA set at 3

To determine fittings required for FILT-O-REG installation, measure the Outside Diameter of your fuel line, if metal; measure the Inside Diameter, if flexible hose. Use closest size fitting to measurement taken. FH-4 for 1/4" prox., FH-5 for 5/16" prox., FH-6 for 3/8" prox.



GASOLINE FILTERS

INSTALLATION OF View-Air Filter on IMPORTED CARS Measure fuel line Outside Diameter on metal lines, Inside Diameter on flexible hose. Use "VA" filter model having nipple ends closest in diameter to measurement taken. Install using hose clamps at each end. VA-4 nipples are 1/4" O.D., VA-5 nipples are 5/16" O.D., VA-6 nipples are 3/8" O.D.

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